Space Weather Forecast

Issued on Friday, 23 December 2022 at 00:36 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of Moderate-class X-ray flares and slight chance of Minor Geomagnetic Storms.

Analysis of Space Weather Activity over past 24 hours
Solar Activity: Solar activity has been Low, with a couple of minor Common-class flares, the largest of which came from a region in the northeast. There are currently 7 sunspot regions on the front facing disc, with the largest region now rotating off the southwest limb but a new region rotating on in the northeast. The region in the northeast mentioned above, despite only having penumbra on its one main spot, has some minor magnetic complexity. The other large region in the northeast is now a unipolar region with its trailing spots decaying. All other regions remain small and simple at present.
No Earth directed Coronal Mass Ejections (CMEs) were observed in available imagery during the period. An eruption from the northeast around 22/1700 UTC has not yet shown in coronagraph imagery, but has the potential to be Earth-directed if it has not been re-absorbed.

Solar Wind / Geomagnetic Activity: The solar wind is showing gradual transition into a weak coronal hole fast wind. Wind speeds have been mostly slightly elevated, rising slightly from near 400 km/s to around 500 km/s. The total Interplanetary Magnetic Field is currently weak, but became mostly moderate between 22/1130-2230 UTC. The north-south component is varying weakly, but varied moderately for a time. Resultant geomagnetic activity was Quiet to Unsettled (Kp 1-3), with an Active (Kp 4) interval 22/1800-2100 UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) remained at background levels with no solar radiation storms observed.

Four-Day Space Weather Forecast Summary
Solar Activity: Solar activity is likely to remain Low, with occasional Common-class flares. There remains a chance of Moderate-class flares throughout the forecast period as departing spots are anticipated to be replaced by new regions from the far side.

Solar Wind / Geomagnetic Activity: No CMEs currently feature in the forecast. Solar winds are forecast to be slightly elevated or elevated through the period due to ongoing coronal hole fast wind effects.
Quiet to Unsettled geomagnetic activity is most likely, with spells of Active. There is a slight chance of G1/Minor storms throughout, most likely as Earth transitions to a new fast wind later on Day 1 or early on Day 2 (23-24 Dec) and again on Day 4 (26 Dec) with a further fast wind from another coronal hole.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is expected to persist at background levels. However, there is a slight chance of the count rate increasing with any notable flares, potentially reaching the S1/Minor Radiation Storm level.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	20	20	10	20
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	25	25	25	25
Very Active	R3 to R5 X	No	2	2	2	2

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	5	5	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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